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Experimental investigation of straight shape thermosyphon filled with R410A refrigerant (Article)

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Abstract

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This paper investigated the thermal performances of a straight shape thermosyphon filled with R410A refrigerant subjected to low heat flux from 1882 W/m^2 to 4423 W/m^2 and evaporator wall temperatures between 20 °C and 40 °C with fill ratios 0.75 and 1.00 and at different inclinations from 45° to 90°. The axial temperature distribution of the thermosyphon was found to be uniform for all temperature differences of evaporator at all power inputs. It was found that the performance of the thermosyphon which is determined from the heat transfer capability of the thermosyphon depends on inclination angle and fill ratio. Experimental results show that the heat transfer coefficient increases as the heat input increase while thermal resistance decreases exponentially with increasing input power. Increase infill ratio and inclination angle at various heat input contributed to a better thermosyphon performance, at where heat transfer was highest at fill ratio 1.00 and inclination angle of 68°.

SciVal Topic Prominence

Topic: Heat pipes | Siphons | Evaporator section

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Author keywords

Heat transfer coefficient | Inclination angle | The Filling ratio | Thermal resistance

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References (15)

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1 Faghri, A.
Heat Pipes: Review, opportunity, and challenges
(2014) *Frontiers in Heat Pipes*, pp. 1-48. Cited 102 times.

2 Nguyen-Chi, H., Groll, M.
Entrainment or flooding limit in a closed two-phase thermosyphon
(1981) *Journal of Heat Recovery Systems*, 1 (4), pp. 275-286. Cited 23 times.
doi: 10.1016/0198-7593(81)90038-2
View at Publisher

3 Park, Y.J., Kang, H.K., Kim, C.J.
Heat transfer characteristics of a two-phase closed thermosyphon to the fill charge ratio
(2002) *International Journal of Heat and Mass Transfer*, 45 (23), pp. 4655-4661. Cited 64 times.
doi: 10.1016/S0017-9310(02)00169-2
View at Publisher

4 Ong, K.S., Goh, G., Tsahi, K.H., Chi, W.M.
Thermal resistance of a thermosyphon filled with R410A operating at low evaporator temperature
(2016) *Frontiers in Heat Pipes*, 5, pp. 1-7. Cited 2 times.

5 Alizadehdakhel, A., Rahimi, M., Alsairafi, A.A.
CFD modeling of flow and heat transfer in a thermosyphon
(2010) *International Communications in Heat and Mass Transfer*, 37 (3), pp. 312-318. Cited 146 times.
doi: 10.1016/j.icheatmasstransfer.2009.09.002
View at Publisher

6 Akash, Two-phase thermosyphon-A review of studies, an
(2016) *International journal of engineering science & research technology*, 5 (1), pp. 193-205. Cited 2 times.

7 Amatachaya, P., Srimuang, W.
Comparative heat transfer characteristics of a flat two-phase closed thermosyphon (FTPCT) and a conventional two-phase closed thermosyphon (CTPCT)
(2010) *International Communications in Heat and Mass Transfer*, 37 (3), pp. 293-298. Cited 29 times.
doi: 10.1016/j.icheatmasstransfer.2009.11.004
View at Publisher

8 Anjankar, P.G., Yarasu, R.B.
Experimental analysis of condenser length effect on the performance of thermosyphon
(2012) *International Journal of Emerging Technology and Advanced Engineering*, 2 (3), pp. 2250-2459. Cited 24 times.

9 Jafari, D., Filippeschi, S., Franco, A., Di Marco, P.
Unsteady experimental and numerical analysis of a two-phase closed thermosyphon at different filling ratios
(2017) *Experimental Thermal and Fluid Science*, 81, pp. 164-174. Cited 29 times.
doi: 10.1016/j.expthermflusci.2016.10.022
View at Publisher

10 Gedik, E.

Experimental investigation of the thermal performance of a two-phase closed thermosyphon at different operating conditions

(2016) *Energy and Buildings*, 127, pp. 1096-1107. Cited 23 times.
doi: 10.1016/j.enbuild.2016.06.066

View at Publisher

11 Sukchana, T., Pratinthong, N.

A two-phase closed thermosyphon with an adiabatic section using a flexible hose and R-134a filling

(2016) *Experimental Thermal and Fluid Science*, 77, pp. 317-326. Cited 13 times.
doi: 10.1016/j.expthermflusci.2016.04.027

View at Publisher

12 Kim, K.M., Bang, I.C.

Comparison of flooding limit and thermal performance of annular and concentric thermosyphons at different fill ratios

(2016) *Applied Thermal Engineering*, 99, pp. 179-188. Cited 10 times.
http://www.journals.elsevier.com/applied-thermal-engineering/
doi: 10.1016/j.applthermaleng.2015.12.137

View at Publisher

13 Hazarika, M.M., Ramgopal, M., Bhattacharyya, S.

Studies on a transcritical R744 based summer air-conditioning unit: Impact of refrigerant charge on system performance

(2018) *International Journal of Refrigeration*, 89, pp. 22-39. Cited 4 times.
doi: 10.1016/j.ijrefrig.2018.03.007

View at Publisher

14 Zhang, P., Shi, W., Li, X., Wang, B., Zhang, G.

A performance evaluation index for two-phase thermosyphon loop used in HVAC systems

(2018) *Applied Thermal Engineering*, 131, pp. 825-836. Cited 6 times.
http://www.journals.elsevier.com/applied-thermal-engineering/
doi: 10.1016/j.applthermaleng.2017.12.056

View at Publisher

15 Samba, A., Louahlia-Gualous, H., Le Masson, S., Nörterhäuser, D.

Two-phase thermosyphon loop for cooling outdoor telecommunication equipments

(2013) *Applied Thermal Engineering*, 50 (1), pp. 1351-1360. Cited 72 times.
doi: 10.1016/j.applthermaleng.2012.05.023

View at Publisher